

Presenter: Dr. Christine Lambkin - Curator of Entomology (Biodiversity Program)**Topic: Bee Flies**

Hi. I'm Chris Lambkin. I'm a curator of entomology at the Queensland Museum. Today I'm going to discuss adaptations in a group of flies that are commonly referred to as bee flies. This is a group I have been working on for some years and they're got some very interesting adaptations.

This group have larvae that live as parasites on wasps and bees and some other insects in the ground. So what they do is, they emerge from the ground as pupae that have crawled up through, using spines, up to the surface of the ground, and then they sit and emerge as big flies. Those flies have to then sit on the ground while they expand their wings. At that time, they are at high risk of predation by spiders, lizards and birds.

For that reason, we think they have a certain number of adaptations which we normally call **crypsis** or **camouflage**. So crypsis is a particular type of camouflage where the beast tries to match the colours of the background that they're sitting on. So we have some of those bee flies here that generally try to look a little bit like the background. So they're brownish and they quite commonly sit on sandy paths.

Others in this group have slightly different types of crypsis where their body patterns are what we call **disruptive colouration**. It's a type of crypsis and all this disruptive colouration really means is that they have patterns on the body that break up the outline of the body. So that when they're sitting on the ground they cannot be recognised so easily as a fly. And so this particular group have particularly nice disruptive colouration where they've got a band across the body so that you can't see the outline of the abdomen.

Another type of crypsis is called **coincident disruptive coloration**, and in this type of camouflage or crypsis what's happened is the patterns not just go across the body, but they include a pattern on the wing. So they don't actually look like a fly while they're sitting on the ground.

My studies tended to show that this type of colouration - these patterns - occurred right around the world; what we call **convergent evolution**, where unrelated organisms have adapted because of the same selective pressures. They all tend to live in the same types of environment. They all tend to do the same things and therefore, they have adapted in such a way to have these colour patterns but some of those closest colour patterns actually occur between groups that are not very closely related.

So these are some of the aspects of my research that have shown us that this particular group in Australia has some very, very amazing adaptations.

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Addendum:

Crypsis: colour patterns resemble a random sample of the background as seen by predators.

1. **Background matching:** colour patterns resemble a random sample of the visual background in shape, size, and colour seen at the time and place of highest risk of predation.
2. **Disruptive coloration:** some of the colour patterns (especially those of the margin) resemble a random sample of the visual background while others contrast strongly, breaking up the margins of the body.
3. **Coincident disruptive coloration:** the contrasting colour patterns join separate parts of the body (such as wings and abdomen), which is especially useful for when the insect is at rest and at highest risk of predation.